WHAT IS CLAIMED IS:

1. A medication inhaler training device, comprising:

a medication inhaler simulator including:

a housing having a bore extending therethrough, and

a mouthpiece connected with said housing and being in open communication with said bore; and

a control circuit for measuring pressure drop at a position below said mouthpiece, said control circuit including:

a pressure transducer for producing an output signal corresponding to said pressure drop at said position,

a display for providing an indication of acceptable inhalation, and

a microprocessor connected with said display for controlling said display in response to said output signal from said pressure transducer and elapsed time.

2. The training device according to claim 1,

wherein said medication inhaler simulator further includes an opening in a wall of said housing; and

further including a conduit having one end connected with said wall of said housing at said opening and an opposite end connected with said pressure transducer, wherein said control circuit measures said pressure drop at said opening.

3. The training device according to claim 2, wherein said housing includes a restriction arrangement for restricting air passage through a portion of said bore to provide adjustment of a pressure drop through said bore.

4. The training device according to claim 3, wherein said opening in said housing is positioned between said restriction arrangement and said mouthpiece.

5. The training device according to claim 1, wherein said mouthpiece is removably mounted on said housing.

6. The training device according to claim 5, wherein said mouthpiece is threadedly mounted on said housing.

7. The training device according to claim 1, wherein said housing includes a closed end covered by said mouthpiece, said closed end including:

a pressure sensing opening positioned above the pressure transducer, and

at least one air flow opening fluidly connected with an outside of said housing.

8. The training device according to claim 7, wherein said housing includes at least one recessed wall section positioned below said at least one air flow opening.

9. The training device according to claim 7, wherein said recessed wall section includes a curvature that reduces in depth in a radial dimension at an intermediate portion thereof to create an air flow restriction with said mouthpiece so as to create a venturi effect.

10. The training device according to claim 1, wherein said control circuit includes an analog-to-digital converter connected between said pressure transducer and said microprocessor for digitizing said output signal prior to supply thereof to said microprocessor.

11. The training device according to claim 1, wherein said control circuit includes a start switch for closing a power circuit in order to supply power to said microprocessor from a power supply.

12. The training device according to claim 11, wherein said control circuit further includes a timer circuit for opening said power circuit after a predetermined amount of time.

13. The training device according to claim 11, wherein said control circuit further includes a voltage regulator connected with said power supply through said power circuit, and which supplies a predetermined DC voltage to said microprocessor in response to power supplied by said power supply.

14. The training device according to claim 11, wherein said control circuit further includes a voltage detector connected with said microprocessor, for detecting voltage supplied by said power supply, and for sending a signal to said microprocessor when said voltage is below a predetermined value in order to prevent operation of said microprocessor.

15. The training device according to claim 1, wherein said display includes at least one lighting device which is selectively caused to be illuminated by said microprocessor for providing an indication of both inhalation rapidity and inhalation flow rate peak.

16. The training device according to claim 15, wherein said at least one lighting device include a plurality of light emitting diodes, and further comprising drivers connected between said light emitting diodes and said microprocessor.

17. The training device according to claim 15, wherein said at least one lighting device is arranged to display said inhalation rapidity and said inhalation flow rate peak in a bar graph form.

18. The training device according to claim 15, wherein said at least one lighting device includes a liquid crystal display.

19. The training device according to claim 1, wherein said display includes a lighting device which is selectively caused to be illuminated by said microprocessor to provide a single display which indicates whether inhalation is acceptable.

20. The training device according to claim 19, wherein said single display is a function of values of both inhalation rapidity and inhalation flow rate peak.

21. The training device according to claim 20, wherein said single display includes a plurality of bars which are selectively illuminated in dependence upon a single value calculated from the values of both inhalation rapidity and inhalation flow rate peak.

22. The training device according to claim 21, wherein different ones of said display bars are illuminated with different colors.

23. The training device according to claim 21, wherein there are a plurality n of said bars which are selectively illuminated in dependence upon said single value calculated as follows:

a) if the values of both inhalation rapidity and inhalation flow rate peak are below a threshold value m which is less than n, the lower value of inhalation rapidity and inhalation flow rate peak is displayed as the single value, providing that the flow rate at a predetermined time from the start of inhalation is above a predetermined flow rate, to indicate an unsuccessful inhalation, wherein at least one said bar corresponding to said single value is illuminated,

b) if the values of both inhalation rapidity and inhalation flow rate peak are at least as high as the threshold value, an average truncated value of the values of both inhalation rapidity and inhalation flow rate peak is displayed as the single value, providing that the flow rate at the predetermined time from the start of inhalation is above the predetermined flow rate, to indicate a successful inhalation, wherein a number of said bars corresponding to said single value are illuminated, and

c) if the flow rate at the predetermined time from the start of inhalation is below the predetermined flow rate, to indicate an unsuccessful inhalation, wherein at least one said bar corresponding to said single value is illuminated.

24. The training device according to claim 23, wherein m equals five and n equals ten.

25. The training device according to claim 1, wherein said control circuit is mounted within said housing.

26. The training device according to claim 25, wherein said housing includes a viewing opening, and said display is positioned to be viewed through said viewing opening.

27. The training device according to claim 1, wherein said mouthpiece includes a one-way valve to inhibit contamination of said housing if a patient exhales into the mouthpiece.

28. The training device according to claim 27, wherein said one-way valve includes a retainer having openings mounted in said mouthpiece, and a flexible valve flap mounted on said retainer which moves away from said retainer to permit air flow through said retainer and said mouthpiece during inhalation and which blocks said openings in said retainer during exhale by the patient through the mouthpiece.

29. The training device according to claim 1, wherein:

said control circuit includes a start switch for closing a power circuit in order to supply power to said microprocessor from a power supply; and

the training device further comprises:

a closure cap removably positioned over said mouthpiece, and

an actuation assembly in said housing for actuating said start switch upon removal of said closure cap.

30. The training device according to claim 29, wherein said actuation assembly includes:

a ring mounted for rotation in said housing, said ring including an actuating projection for actuating said start switch upon rotation of said ring, and a first engaging portion; and

a second engaging portion mounted to said closure cap for engagement with said first engaging portion to rotate said ring.

31. The training device according to claim 30, wherein:

said housing includes external threads, and said closure cap includes internal threads for threadedly positioning said closure cap on said housing in covering relation to said mouthpiece;

said first engaging portion extends outwardly of said housing through at least one opening in a wall of said housing; and

said second engaging portion is formed on an inner surface of said closure cap so as to rotate said ring in a first direction upon threaded removal of said closure cap and to rotate said ring in a second direction upon threaded insertion of said closure cap on said housing.

32. A method of assessing a patient's inhalation process with respect to a medication inhaler, comprising the steps of:

inhaling through a mouthpiece of an inhaler simulator having a housing with a bore extending therethrough, with the mouthpiece connected with said housing and being in open communication with said bore;

measuring a pressure drop at a position below said mouthpiece during inhalation through said mouthpiece, and providing an output signal in response thereto;

determining inhalation rapidity in response to said output signal and an elapsed time;

determining an inhalation flow rate peak in response to said output signal; and

providing a display in response to both said inhalation rapidity and said inhalation flow rate peak.

33. The method according to claim 32, wherein said steps of determining inhalation rapidity and determining inhalation flow rate peak are performed in a microprocessor, and further comprising the step of digitizing said output signal prior to supply thereof to said microprocessor.

34. The method according to claim 33, further comprising the step of shutting off power to said microprocessor after a predetermined amount of time.

35. The method according to claim 32, wherein said step of determining inhalation rapidity includes the steps of:

reading the output signal;

determining a starting time when said output signal reaches a predetermined initial value;

determining an ending time when said output signal reaches a predetermined ending value;

determining a time period between said initial value and said ending value; and

determining said inhalation rapidity from a difference between said ending value and said initial value over said time period.

36. The method according to claim 32, wherein said step of displaying includes the step of illuminating at least one lighting device to display said inhalation rapidity and said inhalation flow rate peak in a bar graph form.

37. The method according to claim 32, wherein said step of

displaying includes the step of illuminating at least one lighting device to display an indication of whether inhalation is acceptable.

38. The method according to claim 37, wherein the step of displaying includes the step of selectively illuminating a plurality of bars dependence upon a single value calculated from the values of both inhalation rapidity and inhalation flow rate peak.

39. The method according to claim 38, wherein said step of selectively illuminating includes the step of illuminating the different ones of said display bars with different colors.

40. The method according to claim 37, wherein there are a plurality n of said bars, and the step of displaying includes the steps of:

a) illuminating at least one said bar corresponding to a single lower value of inhalation rapidity and inhalation flow rate peak if the values of both inhalation rapidity and inhalation flow rate peak are below a threshold value m which is less than n, providing that the flow rate at a predetermined time from the start of inhalation is above a predetermined flow rate, to indicate an unsuccessful inhalation,

b) illuminating a number of said bars corresponding to an average truncated value of the values of both inhalation rapidity and inhalation flow rate peak if the values of both inhalation rapidity and inhalation flow rate peak are at least as high as the threshold value, providing that the flow rate at the predetermined time from the start of inhalation is above the predetermined flow rate, to indicate a successful inhalation, and

c) illuminating at least one said bar corresponding to a single value if the flow rate at the predetermined time from the start of inhalation is below the predetermined flow rate, to indicate an unsuccessful inhalation.

41. The method according to claim 40, wherein m equals five and n equals ten.